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Evidence from France**

Sébastien GROBON, François-Charles WOLFF

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Do public scholarships crowd out parental transfers ?

Evidence from France[#]

Sébastien Grobon^{*}

François-Charles Wolff^{**}

March 2022

Abstract: This paper investigates the extent to which means-tested scholarships received by higher education students in France crowd out parental financial support. We estimate a private transfer function using survey data completed in 2014 on a sample of students aged between 18 and 24. When introducing the amount of public scholarship as exogenous covariate, we find that one additional euro of scholarship is associated with a decrease in private transfers of 0.40-0.50 euro. We also consider an instrumental variable strategy which exploits the non-linear schedule of the scholarship amount and find a larger effect with a decrease of 0.50-0.65 euros. Overall, our results suggest that a substantial part of student scholarship benefits low-income parents through a reduction in the money they give to their student children.

JEL Classification: D64, I2, I3, J13, D10

Keywords: public scholarship, students, parental transfers, crowding-out effect, altruism

Declarations of interest: none

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^{*} Corresponding author. DARES, 39-43, quai André Citroën, 75902 Paris Cedex 15, France. E-mail: sebastien.grobon@gmail.com

^{**} LEMNA, Université de Nantes and TEPP. E-mail : francois.wolff@univ-nantes.fr

1. INTRODUCTION

Access to higher education in OECD countries has become more and more widespread over recent decades, with university entry rates having increased from 40% to 60% between 1995 and 2011. Still, inequalities by socioeconomic background persist (Astin, 2004; Chetty et al., 2017). Such inequalities result in part from the increased dependence that young adults and especially students have on their parents' financial transfers over the past 50 years. Parental financial transfers represent a large part of their resources (Schoeni and Ross, 2005) and contribute significantly to inequalities in length of study, leaving home and more broadly opportunities.

In this paper, we analyze the interaction between private and public transfers to higher education students in France, as these constitute two of their main sources of income and determine a large part of their standard of living. The public transfers studied here are scholarships for students who meet several eligibility criteria, among which are limited parental resources (Fack and Grenet, 2015). Private transfers are provided by parents as regular or occasional allowances in the form of pocket money, expenses and/or direct payment of rent. We measure them using a survey database specifically designed to collect this information from youths, with precise questions on all their budgeted items (Castell et al., 2016). For the first time in the literature, we investigate the extent to which means-tested scholarships crowd out parental support.

We contribute to the existing literature in the three following ways. First, assessing the magnitude of the crowding out effect provides information on the effectiveness of those public scholarships in reducing student poverty. Since Barro (1974) and Becker (1974), it is well known that any changes in transfers related to government policies can be partially or completely neutralized by changes in the provision of family support. The anti-poverty effectiveness of public transfers cannot be estimated without taking into account the response from private transfers (Cox and Jakubson, 1995; Schoeni, 2002). When there is crowding out, the policy's effectiveness is reduced by secondary beneficiaries who are not intended to be assisted by it (Lampman and Smeeding, 1983). While means-tested benefits to students such as the US Federal Pell Grant, the UK Maintenance Grant for living costs or the

Spanish *Becas* are aimed at both reducing student poverty and allowing poor families to finance their children's education, little is known about the impact of such public transfer.

Secondly, measuring the crowding-out effect allows investigating how different theoretical models developed over recent decades predict the interaction between public and private transfers. Under altruism (Becker, 1974, 1991), parents care for the well-being of their children by making financial transfers to compensate for differences in living standards. This implies a complete crowding out, at least in the strict version of the model. Under exchange, parents purchase their children's services and upstream attention (Bernheim et al., 1985; Cox, 1987). Also, children who are excluded from the credit market may receive private loans from their parents, whom they will pay back later (Cox, 1990). Both of these can cause a crowding-in effect. Providing empirical evidence is important given the lack of consensus to date (Laferrère and Wolff, 2006).

Third, analyzing the flow of money between parents and children sheds light on the period from which the young adult becomes an independent household with distinct preferences and a separate budget. Studying how parental transfers respond to changes in young adult's resources provides information on the evolution of intra-household resource allocation during this critical period. Not only is this a relevant issue for family economics, but also for how to approach public policies for youth, because whether to target financial benefits to young adults or their parents constitutes a dividing line in European policy models (Chevalier, 2016).

To the best of our knowledge, the crowding-out effect of means-tested scholarships on parental transfers has yet to be explored. A broad assessment of whether public transfers indeed crowd out private transfers is difficult for two main reasons¹.

The first reason is that exploring the crowding-out effect requires detailed data on both private transfers and parental income. In our empirical analysis, we overcome this issue by relying on fiscal data measuring parental resources and complement it with a 2014 survey on a representative sample of all young adults between 18 and 24 years of age. We include all possible sources of income for young adults using detailed information on wages, social

¹ Laferrère and le Blanc (2004) investigate the effect of housing allowances on the co-residence decisions of students in France, specifically by using a 1991–1993 reform that made independent students eligible for household allowances. However, they only estimate the total windfall effect without measuring the potential crowding-out effect at the individual level.

transfers and family transfers. The second difficulty lies in the possible endogeneity bias that results from introducing public subsidies as a covariate in a private transfer equation. In our case, students with poor parents are likely to receive more means-tested public benefits, but the low parental income also affects the amount of private transfer received. Exogenous variations in income have been exploited by a few studies, all of them focusing on the crowding-out effect of private support to the elderly in developing countries (Jensen, 2004; Juarez, 2009; Gerardi and Tsai, 2014).

In our analysis, we restrict our sample to students receiving scholarships based on social criteria, thus focusing on the intensive margin. We begin by estimating a private transfer function in which we control for both parental and student characteristics. When introducing the public scholarship amount as an exogenous covariate, we find a negative correlation between private and public transfers such that one additional euro of scholarship is associated with a decrease of 0.4–0.5 euro in private transfers. To provide a causal interpretation, we exploit the fact that the scholarship amount based on social criteria is calculated from a specific and nonlinear schedule following the strategy described in Angrist and Lavy (1999). Once controlling for endogeneity, we find a slightly larger crowding-out effect such that one additional euro in scholarship reduces the private transfer amount by 0.50–0.65 euro.

The remainder of our paper is organized as follows. In the next section, we briefly describe an altruistic model of private transfers with public subsidies. In Section 3, we present the French system of student scholarships based on social criteria and provide a description of the data. Our econometric strategy is described in Section 4, followed by a discussion of our estimates of the crowding-out effect in Section 5. Finally, Section 6 concludes this work.

2. THEORETICAL FRAMEWORK

We study the interaction between private and public transfers using a two-generation model of parental resource allocation. The literature has suggested two primary motives explaining why parents may transfer resources to their children: altruism and exchange (Cox, 1987 ; Laferrère and Wolff, 2006). Here, we consider a setting with one altruistic parent p and one child k . Let $U(C_p)$ be the utility function of the parent and $V(C_k)$ that of the child, with C_p and C_k being the level of consumption of each generation. We assume that U and V are twice differentiable, with $U_1 > 0$, $U_{11} < 0$, $V_1 > 0$ and $V_{11} < 0$. The parent cares for the well-being

of the child such that the parent will maximize the utility function $U(C_p) + \beta_p V(C_k)$, with β_p a caring parameter such that $0 < \beta_p < 1$. Each generation is endowed with a fixed income, either Y_p or Y_k , which is used to finance private consumption C_p or C_k ². We denote by T the financial transfer made by the parent to the child and assume that $T \geq 0$.

When there is no public transfer, the budget constraints are $C_p = Y_p - T$ for the parent and $C_k = Y_k + T$ for the child, so that the total family consumption $C_p + C_k$ is equal to the total family income $Y_p + Y_k$. There is hence income pooling within the family. The optimal private transfer is obtained from the following maximization program:

$$\max_T U(Y_p - T) + \beta_p V(Y_k + T) \quad (1)$$

From the first-order condition $-U_1(Y_p - T) + \beta_p V_1(Y_k + T) = 0$, the optimal transfer is such that the parent's marginal utility of consumption is equal to the child's marginal utility of consumption weighted by the caring parameter. The transfer depends on both the parent's and child's level of income and we have $\frac{dT}{dY_p} > 0$, $\frac{dT}{dY_k} < 0$ and $\frac{dT}{dY_p} - \frac{dT}{dY_k} = 1$. When the parent is altruistic, the private transfer increases with the parent's income Y_p , but decreases with the child's income Y_k . Thus, the gift will compensate intergenerational differences in living standards³. Also, if there is a shift of one euro from the parent to the child, then the parent will reduce the private transfer by exactly one euro (Altonji et al., 1997).

Now, we assume that the child receives an exogenous public transfer. Denoting by S the public subsidy amount, the budget constraint of the child becomes $C_k = Y_k + T + S$. For the moment, we do not account for the financing of the public transfer and the budget constraint of the parent remains $C_p = Y_p - T$. The total family consumption $C_p + C_k$ depends on all sources of income $Y_p + Y_k + S$. We have $\frac{dT}{dY_p} > 0$, $\frac{dT}{dY_k} < 0$, $\frac{dT}{dS} = 0$ and $\frac{dT}{dY_p} - \frac{dT}{dS} = 1$. The parental transfer will be a decreasing function of the public transfer S . There is a crowding-out effect of the private transfer as a result of the public transfer, and the parent becomes a "secondary beneficiary" of the public transfer (Lampman and Smeeding, 1983)⁴.

² The model can easily be extended to account for endogenous labor supply, such that the child receives additional resources from labor force participation (see Wolff, 2006).

³ With many children, parents will compensate inequalities within the sibship by giving more money to their less well-off children.

⁴ This crowding-out effect can even be equal to one in some circumstances. As discussed in Barro (1974), this will

Next, we endogenize the public subsidy, which is expressed as a function of the total family income $S = S(Y_p + Y_k)$. A family with a high total income will receive less public support than a family with a low income, so that $\frac{\partial S}{\partial Y_p} < 0$ and $\frac{\partial S}{\partial Y_k} < 0$. The optimal private transfer satisfies :

$$\max_T U(Y_p - T) + \beta_p V(Y_k + T + S(Y_p + Y_k)) \quad (2)$$

The effects of each family income on the private transfer are $\frac{dT}{dY_p} = \frac{U_{11} - \beta_p V_{11} \frac{\partial S}{\partial Y_p}}{U_{11} + \beta_p V_{11}} > 0$ and $\frac{dT}{dY_k} = \frac{-\beta_p V_{11} \left(1 + \frac{\partial S}{\partial Y_k}\right)}{U_{11} + \beta_p V_{11}} < 0$. Since $\frac{\partial S}{\partial Y_p} < 0$, it follows that $U_{11} - \beta_p V_{11} \frac{\partial S}{\partial Y_p} < 0$ and thus $\frac{dT}{dY_p} > 0$. A rich parent will transfer more money to a child than will a poor parent, but the child will get less public subsidy because of the higher resources of the parent. For the child's income, we assume that $-1 < \frac{\partial S}{\partial Y_k} < 0$, i.e. the public transfer is reduced by less than one euro when the child's income is increased by one euro. Since $1 + \frac{\partial S}{\partial Y_k} > 0$, the derivative $\frac{dT}{dY_k}$ remains negative and a less well-off child receives more money from the parent than does a rich child. Overall, this framework leads to a private transfer function with a public subsidy serving as a potentially endogenous covariate that will drive our econometric modeling.

Whereas the central assumption behind the complete crowding-out effect is parental altruism, incomplete crowding-out can occur under alternative models, for example when introducing a transfer that does not depend solely on altruism. This would be the case with impure altruism (Andreoni, 1989) and the crowding-out effect is expected to be lower when the parental utility depends more on the "warm glow". Redistribute neutrality is also not satisfied when the child's labor supply is endogenous or when the child's effort is private information (Fernandes, 2011), which should lead to some incomplete crowding-out. A crowding-in effect is even possible under exchange (Cox and Jakubson, 1995, Cox, 1987). So, in the general case, the sign of the public transfer amount can be either positive or negative in a private transfer equation.

occur once we account for the issue of financing the public expenditures.

3. CONTEXT AND DATA

3.1 Student scholarships in France

We begin with a description of the student scholarship program. In France, student scholarships are designed to cover part of the cost of living for households with low incomes in relation to the number of dependent children and the distance to the place of study. They are granted to about one third of higher education students. Among the 2,470,700 students in higher education during the 2014–2015 academic year, around 62% (1,531,300) attended public university. For that year, the number of scholarship recipients based on social criteria was 655,858 corresponding to 27% of the total number of students and 36% of those enrolled in a course of study that grants entitlement to a scholarship.

The higher education system in France is primarily financed by the State (Ministry of Higher Education, 2015). Education is not totally free, but public funding implies much lower education fees compared to the United Kingdom and the United States. As a consequence, a small proportion of students resort to loans (less than 10% according to our data) or paid work, around 20% over the period 2013–2015 (Zilloniz, 2017). Still, for low economic background families, the cost of studying rather than working can be a serious issue. For instance, 36% of French students with a disadvantaged background claimed that they did not have enough money to cover their needs (Belghith *et al.*, 2017). The French system of public scholarships is designed to help some of those families by allowing them not to pay tuition fees and for some of them to have a portion of their living costs covered by a monthly amount, based on various social criteria detailed below. Those scholarships are granted to young people on the basis of both their individual circumstances and their family resources.

The official scheme offers eight levels of scholarship ranging from the lowest level 0, which only waives tuition fees, to the highest level 7 with a subsidy of 554 euros per month. The intermediate levels are 101 euros (level 0A), 167 euros (level 1), 251 euros (level 2), 321 euros (level 3), 392 euros (level 4), 450 euros (level 5) and 477 euros (level 6)⁵. The eligibility for each level depends on parental resources (taxed income based on the family's yearly tax return of two years prior) and a certain number of points for eligibility criteria awarded to each family

⁵ See the official decree: JORF n°0191, August 20th 2014, page 13803, text n° 9, available online at <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000029374754>. The scholarships are based on social criteria and awarded over a 10-month period to students in formal education.

on the basis of family structure (calculated by the number of siblings) and the distance between parental home and location of higher studies. One eligibility point is given for a distance between 30 and 249 kilometers, and 2 points for a distance of 250 kilometers and over. In addition, two points are given for each sibling with a tax liability, and as much as four points are awarded for each sibling in higher education.

Overall, the public scholarship amount paid to the student is a non-linear combination of both the number of points and parental tax income. We plot the detailed scholarship scheme in Figure 1, with intensities of grey indicating the different levels. For a given amount of family income, students have access to higher levels of scholarship when more points are awarded to their household. Symmetrically, the applicant's number of points on the official scale determines the maximum amount of resources for which they qualify at each scholarship level⁶. In what follows, we will exploit this discontinuous scheme to estimate the effect of public scholarship transfers on private transfers.

Figure 1

3.2 The ENRJ Survey

Our empirical analysis is based on fiscal parental data matched with a household survey completed by young adults aged 18 to 24 and their parents in France in 2014. The National Survey of Youth Resources (*Enquête Nationale sur les Ressources des Jeunes*, ENRJ hereafter) is the only source of data available in France for studying the interactions between public and private transfers to students⁷. It was carried out from October 1st to December 31st 2014 by the French Ministry of Social Affairs (DREES) and the National Institute of Statistics and Economic Studies (INSEE).

Regarding private transfers, a specific module was devoted to the various forms of help received by family members while distinguishing between regular funding not assigned to a particular type of expenditure, but given to the young person who can manage it freely, and other forms of additional aid for specific expenditures. The various transfers are reported by

⁶ See JORF n°0191, August 20th 2014, page 13804, text n° 10, available online at <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000029374760>.

⁷ The ENRJ provides the first representative sample of all young people residing in France and living either with their parents, in an independent dwelling or in a community such as a campus. The data were collected using a flexible method that combined face-to-face and telephone interviews, which was successful in spite of the diverse residential situations.

the young respondents themselves and are recorded by budget item, namely housing, food, transportation, clothing, communications, education and leisure expenditures. This by-item approach identifies all transfers from parents, regardless of their frequency and nature. We know the monthly amount received for each item and we add the various inflows to obtain the total amount of private transfer.

The ENRJ survey also includes other types of resources supporting the students, such as other social incomes (unemployment benefits, housing allowances and family allowances) and wage. Students were asked whether they received any scholarship. If so, the respondents indicated the level of scholarship received (from 0 to 7), to which we associate the official amount. Each student also reported the scholarship amount received per month. This allows us to compare the self-assessed amount with the amount associated with the self-assessed scholarship level. The survey also includes information about the dwelling locations of both the young adult and the parents, which allowed us to construct distance variables. No information is available on the number of siblings studying, but it can be derived from the probability of being in school given the young person's age, as observed in a panel survey conducted by the Ministry of Higher Education.

Interviews were conducted on both the young person and at least one of their parents (both parents if they were separated), with 5,800 young people and 6,300 parents responding to the survey. As emphasized in Altonji et al. (1997), information on both the child's and the parent's economic situation is crucial for estimating a private transfer function. The ENRJ took this dual approach in order to maximize precision when matching the survey with the administrative data provided by the tax authorities⁸. This makes it possible to obtain accurate measures of parental income while also controlling for the characteristics of both the young adult and their parents. In the case of separated parents, both parents were interviewed in order to obtain more accurate information on this population, for whom the determinants of transfers may be more complex (Furstenberg, 1995).

In our paper, we examine the magnitude of the crowding-out effect at the intensive margin, i.e. we focus on the sample of students receiving a public scholarship. This sample restriction allows us to know the precise eligibility criteria for the public transfer, as those students rarely

⁸ For details on the matching, see Grobon et al. (2018).

benefit from other social transfers. The fact that those students depend mostly on parental transfers (Castell et al., 2014) is also relevant for studying the interaction between public and private transfers. The ENRJ survey identifies 949 young adults receiving a public scholarship, although not all of them are in higher education. We focus on respondents benefitting from a higher education scholarship based on social criteria (N = 810). As level 0 consists only of an exemption from university tuition, we further restrict our attention to students whose scholarship ranges from level 0A to level 7. We end up with a sample comprising 696 young adults who are matched with their parents.

In Table 1, we provide a description of the characteristics of the selected students and their parents. The proportion of male students in the sample is 53.4% and the average student age is 19.8 years. Around 16% have a paid job on the labor market while studying. Also, 46.3% of students live in an independent dwelling and 79.9% of students live in proximity to where they study⁹. Nearly one-third of students in our sample have divorced parents, and their parents have completed high school in about half of all cases. Overall, the monthly scholarship amount reported by students is 279.5 euros. By comparison, the average amount of assistance received from parents is 274.5 euros.

Table 1

According to Figure 2, there is a relative stability in the amount of total transfers (public and private) received by students who have been granted one of the first four levels of scholarship : 509 euros for level 0A, 514 euros for level 1, 537 euros for level 2 and 547 euros for level 3. For higher levels, the total amount of transfers tends to increase gradually from 571 euros at level 4 to 633 euros at level 7. At the same time, the respective contributions to total support from private and public transfers strongly vary according to the level of scholarship. Parents behave as if they were trying to adapt their own financial support so that their children can maintain a minimum amount of resources (around 500 to 600 euros per month). The relative weight of public transfers is 28.9% for the lowest level (0A), then it increases to 56.8% for level 2, 74.4% for level 4, and 86.5% for the highest level, with some heterogeneity in the level of private transfer at a given scholarship level.

⁹ Living in proximity corresponds to situations where students live 100 km or less from the parental home or students indicated that they chose their place of study primarily because of its geographic proximity.

Figure 2

We further investigate the relationship between private and public support in Figure 3. Overall, we find a negative correlation (-0.378) between the two types of resources. This pattern suggests some crowding-out effect of private transfers by public scholarships. At the same time, the provision of family support is expected to depend on the characteristics of both students and their parents. As shown in Table 1, private transfers increase with parental income : 139.9 euros for parents in the 1st quintile of income, 276.6 for the 3rd quintile and 398.5 for the 5th quintile. Also, parents with higher education tend to help their young adult children in a more systematic way and with higher amounts. Conversely, public transfers are substantially lower when the parental income increases. This is due to the fact that the public scholarship is a means-tested benefit. Private and public transfers also vary with the recipient's age and number of siblings.

Figure 3

4. ESTIMATION STRATEGY

We turn to an econometric analysis to investigate how public scholarships affect financial transfers received by students. We seek to estimate the effect that a one-euro increase in public scholarship has on the private transfer amount received by children, conditional on having received a scholarship. The main difficulty to overcome is the endogeneity of the amount of public aid, which is not randomly assigned. We assume that the private transfer amount T depends on both the scholarship S and a set of family and individual characteristics summarized by the vector X , which includes in particular the parental income Y_p . We consider the following linear model to explain the amount of private assistance T received by a student also benefiting from a scholarship:

$$T = \delta S + X\beta + \varepsilon \quad (3)$$

where δ and β are parameters to estimate and ε is an error term such that $E(\varepsilon) = 0$. The coefficient of interest is δ which is expected to be negative if there is a crowding out effect. Estimation of (3) using Ordinary Least Squares (OLS) allows a causal interpretation of the crowding-out effect under the assumption of exogeneity of public scholarship while maintaining other control variables constant. In our context, two sources of endogeneity are likely to bias the magnitude of the coefficient δ .

The first source is related to measurement error in the scholarship S . Whether deliberately or not, students may misreport the importance of the public support they receive. If students with large scholarships routinely report a reduced amount of money because receiving public assistance is viewed as a stigma (Moffitt, 1983), then the estimated coefficient $\hat{\delta}$ will overestimate the crowding-out effect. Conversely, if students granted the lowest scholarships report higher amounts compared to those they actually receive, then the magnitude of the crowding-out effect would be underestimated (in absolute value) when using the OLS estimator. The case of a random measurement error in the declared scholarship amounts can also lead to a bias towards 0 in the crowding-out effect (Hutcheon et al., 2010).

The ENRJ survey provides two separate measures of the scholarship amount: the level of scholarship ranging from 0A to 7 and a continuous monthly amount (both measures being self-assessed). On a priori grounds, the measurement error should be less severe when using the scholarship level. Indeed, when they are recipients of the scholarship, students receive a letter indicating to which level they are eligible, so that we can associate to this level the official amount. Conversely, the amount reported directly by the student may be less precise. First, students may be unaware of the exact scholarship amount published by the decree. Second, students may report only an approximate or rounded amount. Third, students may calculate an amount using a 12-month rather than 10-month schedule when converting the annual amount into a monthly allowance.

We present in Figure 4 the theoretical amount associated with each level and the self-assessed amount for which we plot the mean and median. Overall, the average amounts observed in both cases are very close. The monthly amount declared by students (279.5 euros) is slightly lower (2.3%) than the average theoretical amount corresponding to the self-declared level (286.1 euros). Differences in average amounts are slightly larger beyond level 3. Students report lower amounts compared to the theoretical ones with a gap of around 5% for levels 5 to 7. Around 15% (14.9%) of students report an amount that exactly matches the theoretical amount associated with the scholarship level. If a margin of plus or minus 5% is applied to the theoretical amount associated with each level, then 70.1% of the self-reported amounts lies within the interval. Overall, the self-reported and theoretical amounts tend to coincide, but there exist a few situations of over- or under-reporting the scholarship amounts.

Figure 4

A simple way to evaluate the potential role of measurement errors is to introduce as a covariate the theoretical amount S^L associated with the self-declared scholarship level L instead of the self-reported amount :

$$T = \delta^L S^L + X\beta + \varepsilon \quad (4)$$

If we admit that relatively less error exists in the reported level L than in the self-assessed amount S (which seems to be a reasonable assumption, albeit not directly testable), then the estimated coefficient $\hat{\delta}^L$ will be corrected for part of the bias due to measurement error.

The second and main source of endogeneity arises from the fact that the amount of public aid S is not randomly assigned to students. Indeed, the scholarship amount is likely to be correlated with the residual ε unless the factors that trigger the scholarship amount are fully accounted for in the vector X . Although our data offers good proxies for the variables used to derive the number of points for the scholarship scheme, information remains imperfect. This in particular is the case for the school situation of siblings, which was calculated using age of siblings, the distance between parents' home and place of study which is approximated by the distance between the young person's and parents' homes, and the fiscal data based on the previous year's income and not the income of two years prior.

We turn to an instrumental variable (IV) estimator to provide a causal interpretation of the scholarship's effect. The underlying assumption of the IV estimator is that, after controlling for X , the only reason for any association between the instrument and the private transfer is that the instrument and scholarship amount are associated. We address the problem using an approach inspired by the regression discontinuity design of Angrist and Lavy (1999). In our framework, the endogenous regressor S is determined by a discontinuous function of two covariates, which are parental income Y_p and the number of points N (see Figure 1).

Although the rule relating covariates to the public scholarship amount is deterministic (published by decree), our problem corresponds to a case of fuzzy regression discontinuity. This occurs because the ENRJ survey has imperfect information on both parental income and covariates that determine the number of points for eligibility. The connection between IV and fuzzy regression discontinuity is discussed in Angrist and Lavy (1999) and van der Klaauw (2002). In order to identify the causal effect of S on T , the IV estimation of the parental transfer function relies on nonlinearities in the relationship between the scholarship and the covariates determining the amount of public aid. At the same time, the direct influence of

parental income and number of points on private transfers is controlled for by using smooth functions in the vector of control variables X^{10} .

Formally, we rely on a two-stage regression design to estimate $T = \delta S + X\beta + \varepsilon$. The instrument is a predicted amount of scholarship S^T which is calculated using parental fiscal income, available information on the number of children, whether they are studying or not, and the distance between the parents' and young adult's dwellings. Let S^T be the theoretical amount of a scholarship granted by the official scheme for a level of parental income Y_p and a number of points N . We express the relationship between S^T and both Y_p and N as $S^T = f(Y_p, N)$. The first-stage regression is:

$$S = \gamma S^T + X\theta + \zeta \quad (5)$$

with γ and θ parameters to estimate and ζ a residual. Since f is a deterministic function of Y_p and N , and since Y_p and N are expected to be correlated with the amount of private transfer provided by the parent, the identifying assumption is that any effects of both Y_p and N on the parental support are partialled out of the instrument through X in the first stage and controlled for in the second stage regression. We also assume that the eventual error that biases our instrument S^T is orthogonal to that which biases both the amount S and level L of scholarship reported. Whatever the motivation of the private transfer T , we expect a positive correlation between parental income and financial support (Laferrère and Wolff, 2006). Also, the private transfer should be negatively correlated with the number of siblings.

Another necessary identifying assumption is that parents do not strategically exploit the formal rule resulting in the public scholarship amount. It is hardly credible that parents would reduce their labor force participation or give birth to a new child in order to make their student child eligible for a higher public scholarship amount. It could be argued that parents may attempt to modify the income they declare to tax authorities. However, as the scholarship amounts are based on the previous year's tax income, which itself is based on the amounts reported two years prior, such manipulation seems very unlikely. Moreover, as pointed out in Fack and Grenet (2015), the fact that official thresholds are made public late in the year and after the time when candidates apply prevents parents from manipulating the discontinuity

¹⁰ Due to our limited sample size, we cannot make estimates using pairwise comparisons of adjacent scholarship levels at the discontinuity (levels 2 versus level 3 for instance).

of thresholds.

5. RESULTS

5.1. OLS estimates

We begin by presenting linear estimates explaining the private transfer amount under exogenous scholarship. The OLS estimates with robust standard errors are presented in Table 2. Without any family characteristics, variations in scholarship explain 14.3% of variations in family support. We find a negative coefficient equal to -0.631 for the public scholarship amount, which suggests a large crowding out effect (column 1). As the scholarship itself depends on characteristics like parental income and family structure, this order of magnitude is expected to overestimate the real effect of public transfers on parental support.

Table 2

In column 2, we introduce a set of family characteristics that capture these confounding factors. The OLS estimates still suggest substantial crowding-out effect of public transfers by private transfers since an increase of one euro in scholarship is associated with a decrease of 44.3 cents in parental transfers. In other words, students receiving one additional euro through a scholarship benefit from a net gain in resources equal to 55.7 cents : the remainder is absorbed by a reduction in private transfer. Such pattern is consistent with previous studies on family transfers to students in France. In particular, Wolff (2012) found that one additional euro of financial resources received by children (either wage or public transfer) reduced the parental help by around 30 cents. The magnitude of the crowding-out effect is not affected when adding potentially endogenous regressors such as proximity of the parental home to study location, living with a spouse, living independently or having a paid job.

The other coefficients in Table 2 provides information on the determinants of private transfers to young adults. Males and females receive similar support on average. A high number of siblings aged between 0 and 17 puts some pressure on the total amount of resources that parents can devote to their student children. Conversely, there is no effect from number of siblings aged 18-24. Compared to parents with primary or secondary education, those with a high school diploma give about 75 additional euros to their children. Private transfers correlate positively with parental income, but they are not so sensitive to changes in parental

resources. An increase of 1000 euros in the monthly parental income is associated with a 25 euros increase in the transfer amount.

In Table 3, we estimate the same regressions using alternative measures of the public transfer. As students may make errors when reporting their scholarship amount, the underlying bias could be lessened by considering the theoretical amount that is associated with the self-declared level, assuming there is no error in the declared level¹¹. When comparing panel A and panel B, we find very similar results : -0.443 with the self-assessed amount and -0.479 with the theoretical scholarship amount. The fact that the magnitude of the crowding-out effect is very close in both cases is evidence of the coherence between the two measures. In panel C and D, we consider the self-assessed parental income variable rather than the fiscal income. This leads to very a similar order of magnitude of the crowding-out effect: -51.8 cents with the self-assessed scholarship (panel C) and -54.6 cents with the theoretical amount of scholarship (panel D).

Table 3

The marital situation of parents may have some influence on the provision of financial transfers. As shown in Table 2, private support from divorced parents is on average slightly higher than that of parents who stayed together, although the difference is not significant. Even though each divorced parent provides on average less money to their young adult children (Furstenberg et al., 1995; Grobon, 2018), children can nonetheless receive money from two different households, which may lead to an equal or even higher total amount received. Thus, we conduct a separate analysis on intact and non-intact families. The crowding out is higher for non-intact families when using parental fiscal data (columns 3 and 4, panels A and B). In addition, the private transfer is more sensitive to parental income when the sample is restricted to intact families.

5.2. IV estimates

Now we relax the exogeneity assumption of the public scholarship amount and turn to an IV estimation of the crowding-out effect. In a preliminary step, we consider as an instrument the

¹¹ This reduces the sample size to 674 students as the scholarship level is unknown for 22 students.

official amount of scholarship associated to each self-reported level, i.e. S is expressed as a function of S^L along with the other control variables in a first stage. As shown in panel A of Table 4, there is a very strong and positive correlation between the instrument and the self-assessed scholarship amount. This occurs because of limited measurement errors in the self-assessed amount of scholarship. A comparison of the OLS and IV estimates shows a slight increase in the magnitude of the crowding-out effect : an increase of one euro in the scholarship amount reduces the parental transfer by 52.0 cents after instrumentation against 44.3 cents under exogeneity (column 1). Very similar results are obtained with extended controls (column 2) and the coefficient of the scholarship amount is higher (in absolute value) among non-intact families than intact families (columns 3 and 4).

Table 4

In panel B of Table 4, the scholarship amount is instrumented using the predicted transfer S^T calculated from the official scheme. For each student, we calculate S^T using the number of points N and the parental fiscal income Y_p . According to the first-stage estimates, we find that the predicted scholarship S^T is strongly correlated with the self-assessed amount. However, the coefficient associated to the instrument is around 0.64 (column 1). This suggests that for some students we are not able to predict accurately the level of scholarship that they are expected to receive. This could be due to the fact that we consider only the one-year lagged value for parental fiscal income (rather than the two-year lagged income) and we have imperfect information on both the number and studentship status of siblings. Still, the statistic associated to the F-test of the excluded instrument is 131.07, which is much higher than the threshold of 10 when detecting for a weak instrument.

When turning to the second-stage estimates, the magnitude of the crowding out effect is now -59.8 cents : this is around 35% higher compared to the coefficient under exogeneity. When controlling for proximity to the study location, living with a spouse, living in an independent dwelling and participation in the labor market, the coefficient of the public scholarship is -65 cents. As shown in columns 3 and 4, the gap in crowding out between separated parents and those who remained together is higher with the IV estimation. For separated parents, one additional euro of scholarship results in a reduction of -83.4 cents in parental transfer. The marginal effect is divided by two (-39.8 cents) among the households of parents who remained together. This confirms that non-intact families react more to a variation in the young adult's

resources. It also suggests that the stronger IV crowding-out effect compared to OLS is mainly driven by this subsample.

Both in panels A and B of Table 4, we only consider one instrument to explain the scholarship amount so that we cannot implement overidentifying restriction tests. We decide to re-estimate the private transfer equation using two-stage least squares with two instruments : the theoretical amount associated to the self-reported level and the predicted amount from the official scheme¹². In the private transfer equation, we find a negative and significant coefficient for the public scholarship. The marginal effect is -52.4 cents, which is very close to the coefficients reported in column 1 of panels A and B. The Hansen J statistic is equal to 0.900 and the p-value of the corresponding chi-squared is 0.371 (with one degree of freedom), meaning that the null hypothesis of valid instruments cannot be rejected.

As they stand, our results indicate a partial crowding-out of public transfers by private transfers. Under altruism, the parental transfer T is a decreasing function of the amount of public transfer S ($\frac{dT}{dS} < 0$) and the following condition $\frac{dT}{dY_p} - \frac{dT}{dS} = 1$ should hold. Consider the sample comprising all students (column 1, Table 4). With the reconstructed instrument S^T , we have $\frac{dT}{dY_p} = 0.017$ and $\frac{dT}{dS} = -0.598$ so that the difference in derivatives is $\frac{dT}{dY_p} - \frac{dT}{dS} = 0.614$. The standard error of this difference is 0.164 (t=3.74), so that the confidence interval ranges between 0.292 and 0.936 at the 95 percent level. The upper bound is below the unitary value expected under altruism, but the neutrality condition imposed by the altruistic setting is a very demanding condition that has not been verified so far in countries like France or the United States (Altonji, 1997; McGarry, 2016; Wolff, 2000).

Overall, our results are in the same direction as those reported for the same country by Wolff (2012), who investigates the pattern of private transfers using a sample of 21,400 students aged 17–25 years¹³. At the intensive margin (private transfer amount), the marginal effect of the parental income ranges between 0.01 and 0.06 depending on the subsample. Concerning student's resources, Wolff (2012) considers the sum of all public transfers (scholarship, housing allowances and other social benefits) that they receive plus earnings from any paid

¹² These additional results are available upon request.

¹³ The proportion of parents providing money to their children is equal to 77.5%, with an average amount of around 200 euros per month.

activities. He finds that one additional euro of income may decrease by up to 30 cents the transfer amount received from parents. This is substantially lower than our own estimates, but we focus on a specific sample of students receiving a public scholarship and investigate how private transfers reacts to public transfers and not to total resources. Since students eligible to scholarships are more likely to come from modest families, this could explain why we find a large sensitivity of parental transfers to the young person's situation.

Finally, one may wonder the extent to which our results can be generalized to all public benefits received by young adults. In a related study, Laferrère and Le Blanc (2004) investigate the effect of housing allowances on the co-residence decisions of students in France. Using a reform that took place between 1991 and 1993 that made independent students eligible for household allowances, they show that around one-half of the total allowances represents a windfall effect, i.e. students with high-income parents would have nonetheless decided to live independently even without the subsidy. For those families, such pattern can be interpreted as a windfall effect of private transfers being crowded out by public transfers. Although the magnitude of the crowding-out effect is not estimated at the micro level by Laferrère and Le Blanc (2004), their results are fully compatible with our own conclusions.

6. CONCLUDING COMMENTS

In this paper, we investigated how parents adjust their private transfer decisions according to the public scholarships their children receive for higher education. This allows us to provide for the first time evidence on any crowding-out effect on private transfers by public transfers among students. We contribute to a scarce literature on the impact that public transfers have on private transfers in developed countries (Cox and Jakubson, 1995; Schoeni 2002). For our empirical analysis, we rely on a dataset matching fiscal data for parental income and individual data collected in France on young adults.

Our main results can be summarized as follows. Assuming first that the public scholarship is exogenous, we find a reduction in private transfers comprised between 45 and 50 cents per additional euro of public scholarship. Then, we rely on an instrumental variable strategy to provide a causal interpretation of the crowding-out effect. We obtain a slightly larger effect such that one additional euro of scholarship reduces the private transfer amount by 50–65 cents. When calculating the difference between the parental-income transfer derivative and

the child scholarship transfer derivative, we find a point estimate of 0.614 and the unitary value expected under altruism does not belong to the corresponding confidence interval.

Our results are important from a public policy perspective. The existence of a large crowding-out effect is evidence of a windfall effect for parents (Laferrère and Le Blanc, 2004), as a substantial part of the student scholarship benefits the parents by making them secondary recipients through reductions in the money they give their student children (Lampman and Smeeding, 1983). At the same time, public transfer programs devoted to young adults are intended to help those in the most difficult financial situations. In the case of scholarships, the goal is also to make the young person's extended studies sustainable for the whole family. Since one-third of scholarships benefit families below the poverty line according to our data and scholarships may have positive effects both on university enrollment and additional years of education, crowding-out cannot be seen as a measure of policy ineffectiveness¹⁴.

A few caveats have to be kept in mind when interpreting our results. First, we focused on the crowding out effect on a specific sample of students. It would be of interest to account for all public transfers received by young adults and students, not only those receiving means-tested scholarships. Second, we have investigated the magnitude of the crowding out effect at the intensive margin only. It would be useful to study parental support at both the extensive and intensive margins, even though this would require simultaneous modeling of all relevant decisions taken by young adults. Third, some elements of comparison with other European countries would be extremely interesting to better understand the role of public education policies on family support. All these various issues are left for future research.

¹⁴ In France, Fack and Grenet (2015) have shown that those means-tested scholarships increase college enrollment rates by 5 to 7 percent, student persistence and even degree completion. Scholarships are also expected to reduce the need for a student to work. This may also improve the situation of students as paid work during one's studies implies less time spent attending courses and on homework and reduces their chances of passing exams (Befy et al., 2009; Wolff, 2017).

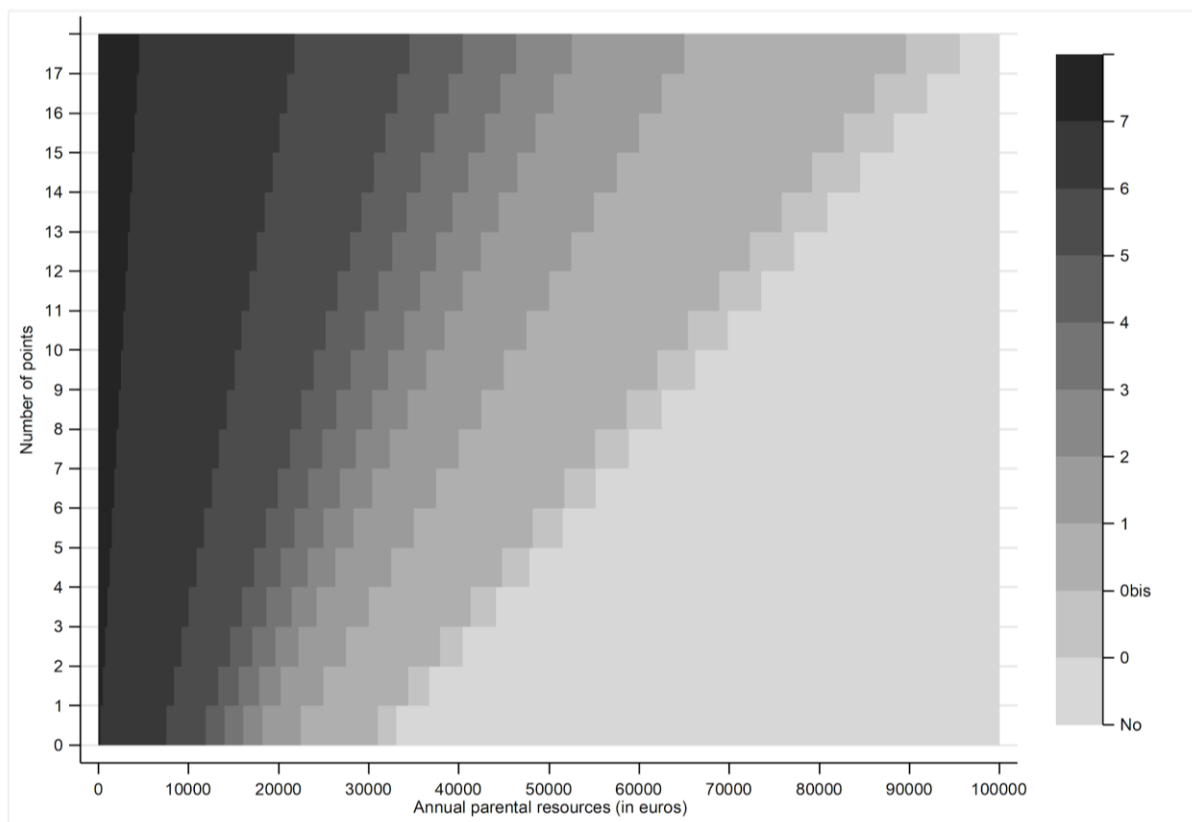
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FIGURES AND TABLES

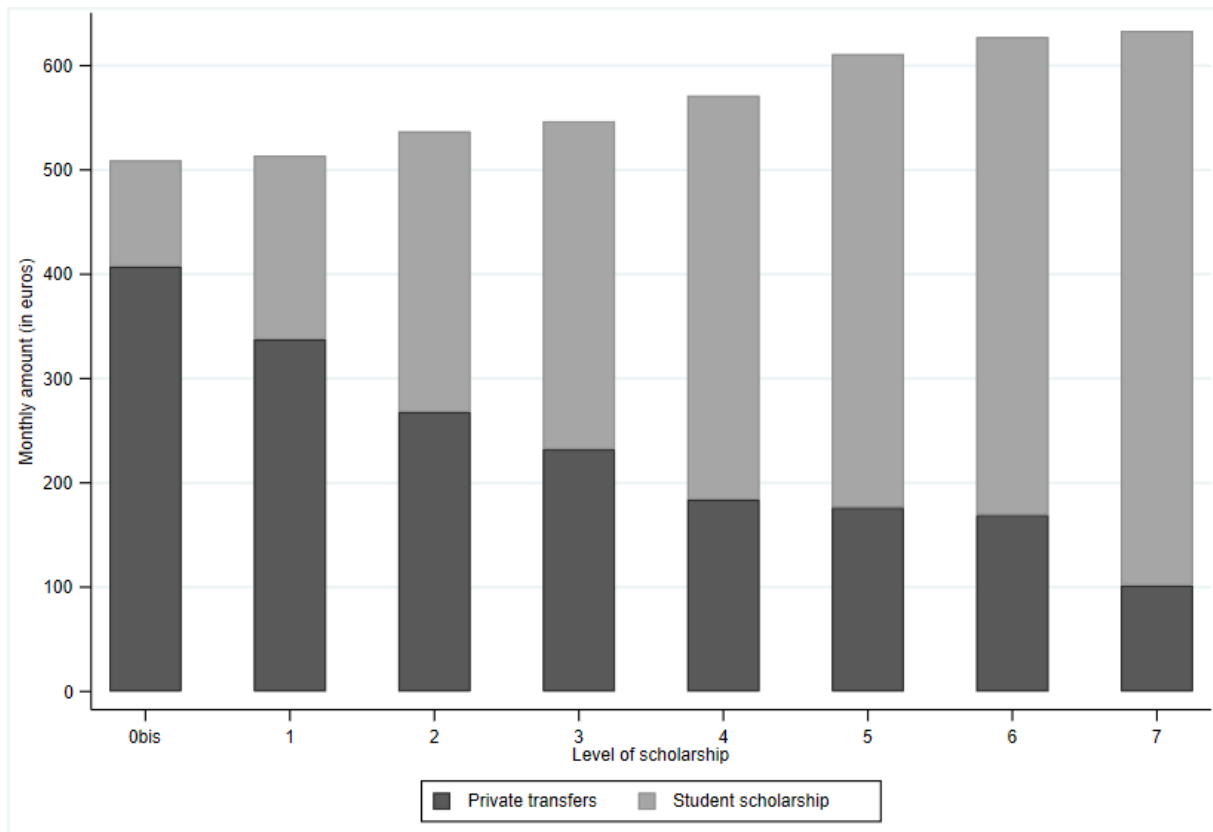
Figure 1. Scholarship scheme for students in France (2014–2015)



Source: authors' calculations, adapted from official schemes.

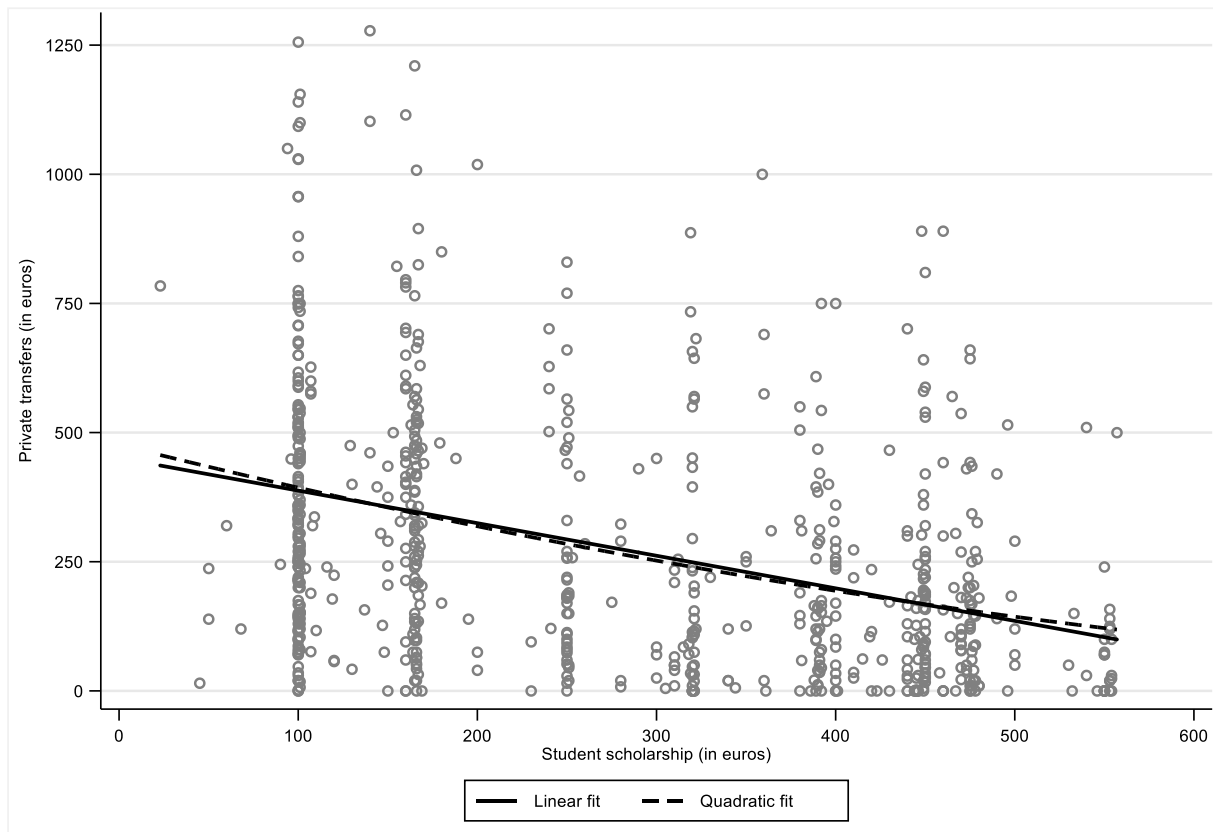
Note: the official scheme includes seven levels of scholarship (from 0, the lowest amount, to 7, the highest). The number of points depends on the family structure. For details on the calculation of these points and the official scheme, see http://www.education.gouv.fr/pid25535/bulletin_officiel.html?cid_bo=81151 and <https://www.legifrance.gouv.fr/eli/arrete/2014/8/5/MENS1416785A/jo/texte>.

Figure 2. Average amounts of private transfers and student scholarship



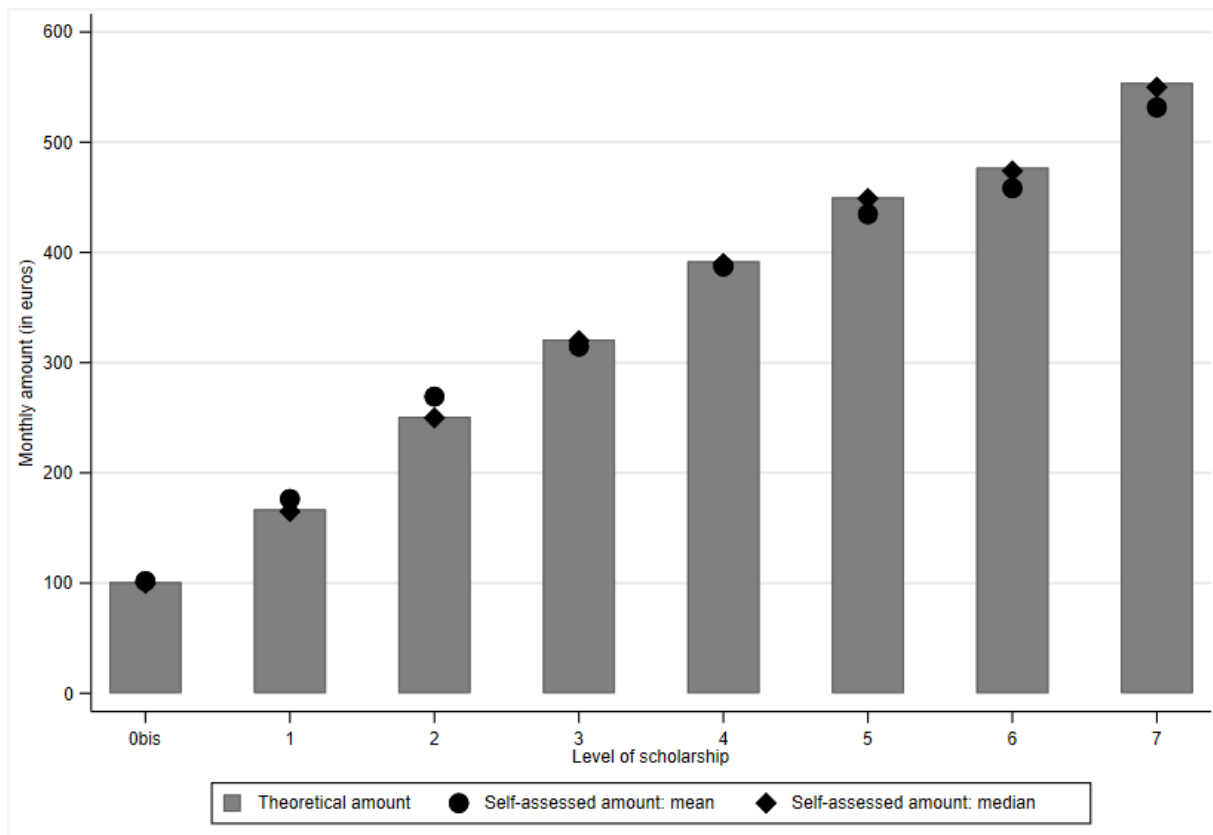
Source: authors' calculations, Drees-Insee – ENRJ Survey 2014.

Figure 3. Relationship between private transfers and student scholarship



Source: authors' calculations, Drees-Insee – ENRJ Survey 2014.

Figure 4. Theoretical and self-assessed amounts of student scholarship



Source: authors' calculations, Drees-Insee – ENRJ Survey 2014.

Table 1. Descriptive statistics of the sample

Variables		Average amount (in euros)		Proportion
		Private transfers	Student scholarship	
<i>Characteristics of student</i>				
Gender	Boy	276.7	283.7	0.534
	Girl	272.0	274.7	0.466
Age	18	321.8	261.1	0.279
	19	298.8	273.4	0.240
	20	223.9	302.0	0.174
	21	250.3	277.9	0.122
	22	240.8	275.8	0.101
	23	255.6	307.3	0.056
	24	178.4	338.3	0.029
Siblings	0	242.6	307.7	0.205
	1	323.6	249.0	0.351
	2	272.4	277.9	0.303
	≥3	203.8	317.6	0.141
Proximity to study location		257.6	282.2	0.799
Lives with a spouse		273.6	291.2	0.046
In an independent dwelling		290.6	285.7	0.463
Participation in the labor market		243.2	279.7	0.157
<i>Characteristics of parents</i>				
Divorced		281.7	316.4	0.320
Education	Primary-secondary	191.4	339.0	0.205
	Vocational training	243.6	276.1	0.286
	High school	325.5	275.3	0.182
	More than high school	325.6	247.3	0.326
Parental income	Quintile 1	139.9	438.5	0.200
	Quintile 2	220.1	340.4	0.200
	Quintile 3	276.6	249.5	0.200
	Quintile 4	338.6	191.6	0.200
	Quintile 5	398.5	176.4	0.200
All (N=696)		274.5	279.5	

Source: authors' calculations, Drees-Insee – ENRJ Survey 2014.

Table 2. OLS estimates of private transfers, with exogenous level of student scholarship

Variables	(1)		(2)		(3)	
	coef	t-test	coef	t-test	coef	t-test
<i>Exogenous scholarship</i>						
Self-assessed amount	-0.631***	(-11.13)	-0.443***	(-6.09)	-0.455***	(-6.27)
<i>Characteristics of student</i>						
Girl			13.313	(0.77)	14.188	(0.82)
Age			-22.055***	(-3.79)	-20.947***	(-3.53)
Number of siblings 0–17			-20.596**	(-2.31)	-18.526**	(-2.10)
Number of siblings 18–24			-2.453	(-0.21)	-3.063	(-0.27)
Proximity to study location					-48.557*	(-1.95)
Lives with a spouse					18.576	(0.43)
In an independent dwelling					3.944	(0.20)
Participation in the labor market					-29.364	(-1.33)
<i>Characteristics of parents</i>						
Age			4.572***	(2.90)	4.470***	(2.83)
Divorced			31.249	(1.62)	30.102	(1.57)
Education	Primary-secondary		ref		ref	
	Vocational training		5.739	(0.27)	7.744	(0.36)
	High school		76.732***	(2.71)	75.124***	(2.65)
	More than high school		47.098*	(1.92)	44.476*	(1.81)
Parental income (fiscal)			0.025***	(3.42)	0.023***	(3.10)
Constant	450.781***	(21.85)	512.353***	(3.99)	544.018***	(4.07)
Number of observations	696		696		696	
R ²	0.143		0.214		0.223	

Source: authors' calculations, Drees-Insee – ENRJ Survey 2014.

Note: estimates from OLS regressions with robust standard errors. Significance levels are 1% (***) , 5% (**) and 10% (*).

Table 3. OLS estimates of private transfers

Variables	(1) All families		(2) All families		(3) Non-Intact families		(4) Intact families	
	Coef	t-test	Coef	t-test	Coef	t-test	Coef	t-test
Panel A. Self-assessed amount of student scholarship and parents' fiscal income								
Student scholarship	-0.443***	(-6.09)	-0.455***	(-6.27)	-0.453***	(-3.66)	-0.373***	(-3.61)
Fiscal parental income	0.025***	(3.42)	0.023***	(3.10)	0.015	(1.49)	0.035***	(3.00)
Control variables	YES: BASIC		YES: EXTENDED		YES: BASIC		YES: BASIC	
Number of observations	696		696		223		473	
R ²	0.214		0.223		0.262		0.204	
Panel B. Theoretical amount of student scholarship and parents' fiscal income								
Student scholarship	-0.479***	(-6.16)	-0.490***	(-6.33)	-0.550***	(-4.10)	-0.354***	(-3.40)
Fiscal parental income	0.022***	(2.99)	0.020***	(2.66)	0.009	(0.93)	0.038***	(3.33)
Control variables	YES: BASIC		YES: EXTENDED		YES: BASIC		YES: BASIC	
Number of observations	674		674		218		456	
R ²	0.218		0.226		0.279		0.203	
Panel C. Self-assessed amount of student scholarship and parents' self-assessed income								
Student scholarship	-0.518***	(-8.06)	-0.520***	(-8.17)	-0.486***	(-3.98)	-0.426***	(-5.04)
Self-reported parental income	0.021***	(3.11)	0.021***	(3.03)	0.008	(0.95)	0.047***	(3.92)
Control variables	YES: BASIC		YES: EXTENDED		YES: BASIC		YES: BASIC	
Number of observations	696		696		223		473	
R ²	0.211		0.221		0.256		0.217	
Panel D. Theoretical amount of student scholarship and parents' self-assessed income								
Student scholarship	-0.546***	(-8.09)	-0.547***	(-8.16)	-0.577***	(-4.41)	-0.424***	(-5.07)
Self-reported parental income	0.019***	(2.76)	0.018***	(2.64)	0.004	(0.45)	0.049***	(4.25)
Control variables	YES: BASIC		YES: EXTENDED		YES: BASIC		YES: BASIC	
Number of observations	674		674		218		456	
R ²	0.216		0.225		0.276		0.216	

Source: authors' calculations, Drees-Insee – ENRJ Survey 2014.

Note: estimates from OLS regressions with robust standard errors. Significance levels are 1% (***), 5% (**) and 10% (*). Basic controls include gender, age, numbers of student's siblings (aged 0–17 and 18–24), age, divorced, education and parents' income. Extended controls for the student additionally include proximity to study location, living with a spouse, in an independent dwelling and participation in the labor market. In panels B and D, observations with missing information on the self-assessed scholarship amount are deleted. This reduces the sample size from 696 to 674.

Table 4. IV estimates of private transfers

Variables	(1) All families		(2) All families		(3) Non-intact families		(4) Intact families	
	coef	t-test	coef	t-test	coef	t-test	Coef	t-test
Panel A. Instrument : self-assessed scholarship level								
<i>IV first stage: student scholarship</i>								
Instrument: amount corresponding to the self-assessed level (S^L)	0.921***	(52.81)	0.920***	(51.88)	0.932***	(38.06)	0.866***	(28.48)
R ²	0.869		0.870		0.847		0.883	
F-test of excluded instrument	2788.65		2691.04		1448.24		811.22	
<i>IV second stage: parental transfer</i>								
Student scholarship	-0.520***	(-6.15)	-0.533***	(-6.32)	-0.590***	(-4.18)	-0.409***	(-3.40)
Parental income	0.020***	(2.65)	0.018**	(2.30)	0.011	(1.12)	0.032**	(2.57)
Control variables	YES: BASIC		YES: EXTENDED		YES: BASIC		YES: BASIC	
Number of observations	674		674		218		456	
R ²	0.212		0.221		0.264		0.201	
Panel B. Instrument : predicted scholarship								
<i>IV first stage: student scholarship</i>								
Instrument: predicted amount by the scheme using our data (S^T)	0.639***	(11.45)	0.637***	(11.31)	0.489***	(4.99)	0.527***	(7.52)
R ²	0.488		0.489		0.304		0.612	
F-test of excluded instrument	131.07		127.92		24.86		56.55	
<i>IV second stage: parental transfer</i>								
Student scholarship	-0.598***	(-3.42)	-0.650***	(-3.75)	-0.834**	(-2.19)	-0.398	(-1.54)
Parental income	0.017	(1.38)	0.012	(1.02)	0.008	(0.62)	0.033	(1.44)
Control variables	YES: BASIC		YES: EXTENDED		YES: BASIC		YES: BASIC	
Number of observations	696		696		223		473	
R ²	0.209		0.214		0.227		0.204	

Source: authors' calculations, Drees-Insee – ENRJ Survey 2014.

Note: estimates from 2SLS regressions, with robust standard errors. Significance levels are 1% (***), 5% (**) and 10% (*). Basic controls include gender, age, numbers of student's siblings (aged 0–17 and 18–24), age, divorced, education and income for parents. Extended controls for the student additionally include proximity to study location, living with a spouse, in an independent dwelling and participation in the labor market.